

Copyright WILEY-VCH Verlag GmbH & Co. KGaA, 69469 Weinheim, Germany,  
2013.

# ADVANCED ENERGY MATERIALS

## Supporting Information

for *Adv. Energy Mater.*, DOI: 10.1002/aenm.201300160

**A High Capacity Calcium Primary Cell Based on the Ca–S  
System**

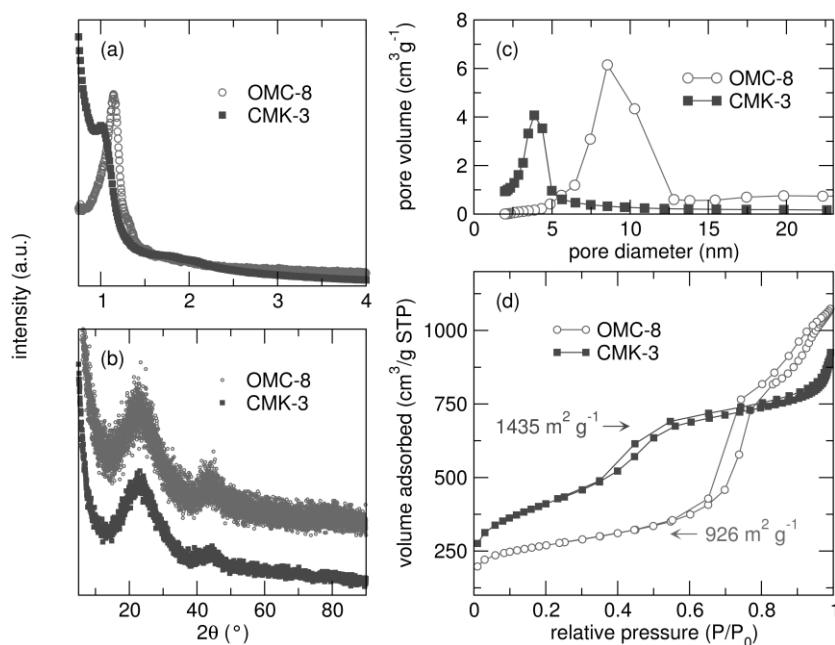
*Kimberly A. See, Jeffrey A. Gerbec, Young-Si Jun, Fred Wudl,  
Galen D. Stucky, and Ram Seshadri\**

## Supporting Information

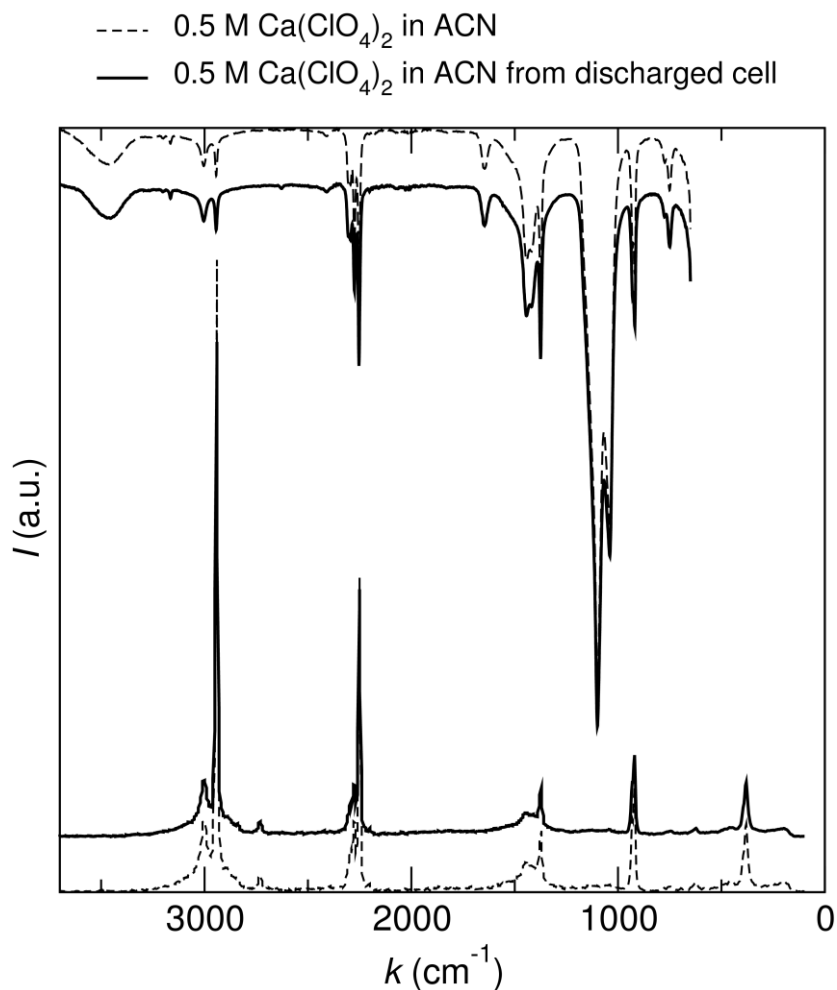
for *Adv. Energy Mater.*, DOI: 10.1002/aenm.201300160

### A high capacity calcium primary cell based on the Ca-S system

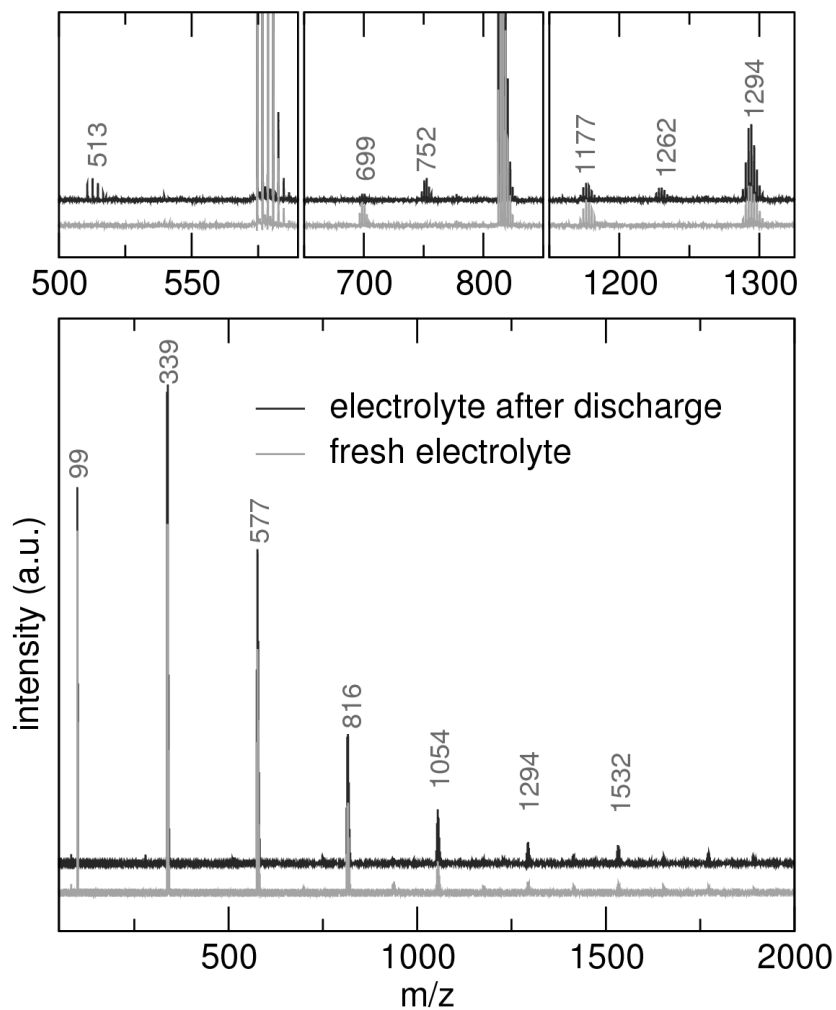
*Kimberly A. See, Jeffrey A. Gerbec, Young-Si Jun, Fred Wudl, Galen D. Stucky, and Ram Seshadri*



**Figure S1.** Characterization of hexagonal mesoporous carbon (CMK-3) and cubic mesoporous carbon (OMC-8) sulfur supports. Characterization of these materials includes (a) small angle X-ray diffraction showing the long range ordering of the pore structure, (b) X-ray diffraction showing two broad peaks indicative of amorphous carbon, (c) pore size distributions as determined by the BJH algorithm on the  $\text{N}_2$  adsorption isotherm and (d)  $\text{N}_2$  adsorption isotherms showing mesoporosity. The Brunauer-Emmett-Teller surface areas are indicated in (d).



**Figure S2.** Raman spectra (bottom traces) and Fourier-Transform Infrared Spectroscopy (top traces) of electrolyte before cycling (dashed black) and after discharging to 0V (solid red) at  $-15^\circ\text{C}$ . There are no additional Raman transitions or FTIR stretches visible indicating that the electrolyte does not contain any contaminants FTIR or Raman active.



**Figure S3.** Electrospray Mass Spectrometry of 0.5 M  $\text{Ca}(\text{ClO}_4)_2$  in ACN before and after discharge. The strong signals (99 m/z, 339 m/z, 577 m/z, etc.) are due to  $\text{ClO}_4^-$ ,  $\text{Ca}(\text{ClO}_4)_3^-$ , etc.; however, the weaker signals at 752 m/z, 1262 m/z, etc. in the discharged electrolyte are due to clustering with  $\text{ClO}_3^-$ .